West Virginia Vectorborne Disease Surveillance Report

JANUARY 1 – AUGUST 31, 2015

The purpose of this report is to share descriptive surveillance data related to vectorborne disease activity with public health partners in West Virginia (WV). All information in this report is considered provisional. For questions or comments, contact Miguella Mark-Carew in the Division of Infectious Disease Epidemiology (DIDE) at miguella.p.mark-carew@wv.gov.

MOSQUITOES

HUMAN SURVEILLANCE

During the period of January 1 to August 31, 2015, two human cases of La Crosse encephalitis were reported from Raleigh County. One travel-associated case of dengue fever was reported from Monongalia County (Table 1).

Table 1. Summary of human cases of mosquito-borne diseases for the current reporting period in WV.

Mosquito-borne Disease	# Confirmed and Probable Human Cases[a] (Total through August 31, 2015)	Comments
Dengue Fever	1	Case traveled to India
La Crosse Encephalitis	2	Both cases from Raleigh Co.
Total	**3**	

[a]Table includes only confirmed and probable cases that have been reviewed and closed by the Zoonotic Disease Epidemiologist.

BIRD AND HORSE SURVEILLANCE

One bird specimen was submitted for arboviral disease testing (Table 2). Results are pending.

Table 2. Summary of surveillance specimens submitted for dead birds and horses (serum) through August 19, 2015.

Type of Specimen	Total through August 31, 2015				Comments
	# specimens submitted	+ Arbovirus[a]			
		WNV	SLE	EEE	
Dead bird	1				Results pending
Horse serum	0				
Total	**1**				

[a]Note: horse specimens are tested for WNV and EEE only.

MOSQUITO SURVEILLANCE

The West Virginia Department of Health & Human Resources Mosquito Surveillance Program initiated adult mosquito surveillance on May 20, 2015. Adult mosquito surveillance has been conducted in the following 17 counties: Berkeley, Cabell, Fayette, Greenbrier, Hancock, Harrison, Jackson, Jefferson, Kanawha, Mercer, Morgan, Nicholas, Raleigh, Roane, Wayne, Wetzel, and Wood (Figure 1). A total of 364 mosquito pools have been tested to date (Table 3).

West Nile virus has been detected in adult mosquitoes from three counties in the western half of West Virginia. West Nile virus was first detected in an adult *Culex* mosquito pool collected in Kanawha County on July 15-16. West Nile virus was also detected in an adult *Aedes japonicus* pool collected on July 22-23 and an adult *Culex* mosquito pool collected on August 12-13 from a different surveillance site in Kanawha County. Further north, three adult *Culex* mosquito pools from Wetzel County and one adult *Culex* mosquito pool from Wood County collected on August 3-4 tested positive for West Nile virus. Adult *Culex* mosquito activity in the southeastern part of the state continues to remain high, particularly near stagnant bodies of water. Furthermore, many of these mosquitoes have been captured using carbon dioxide emitting CDC light traps. The *Culex* mosquitoes are using host cues, like carbon dioxide, to search for a blood meal. *Culex* mosquitoes are usually associated with West Nile virus maintenance and transmission.

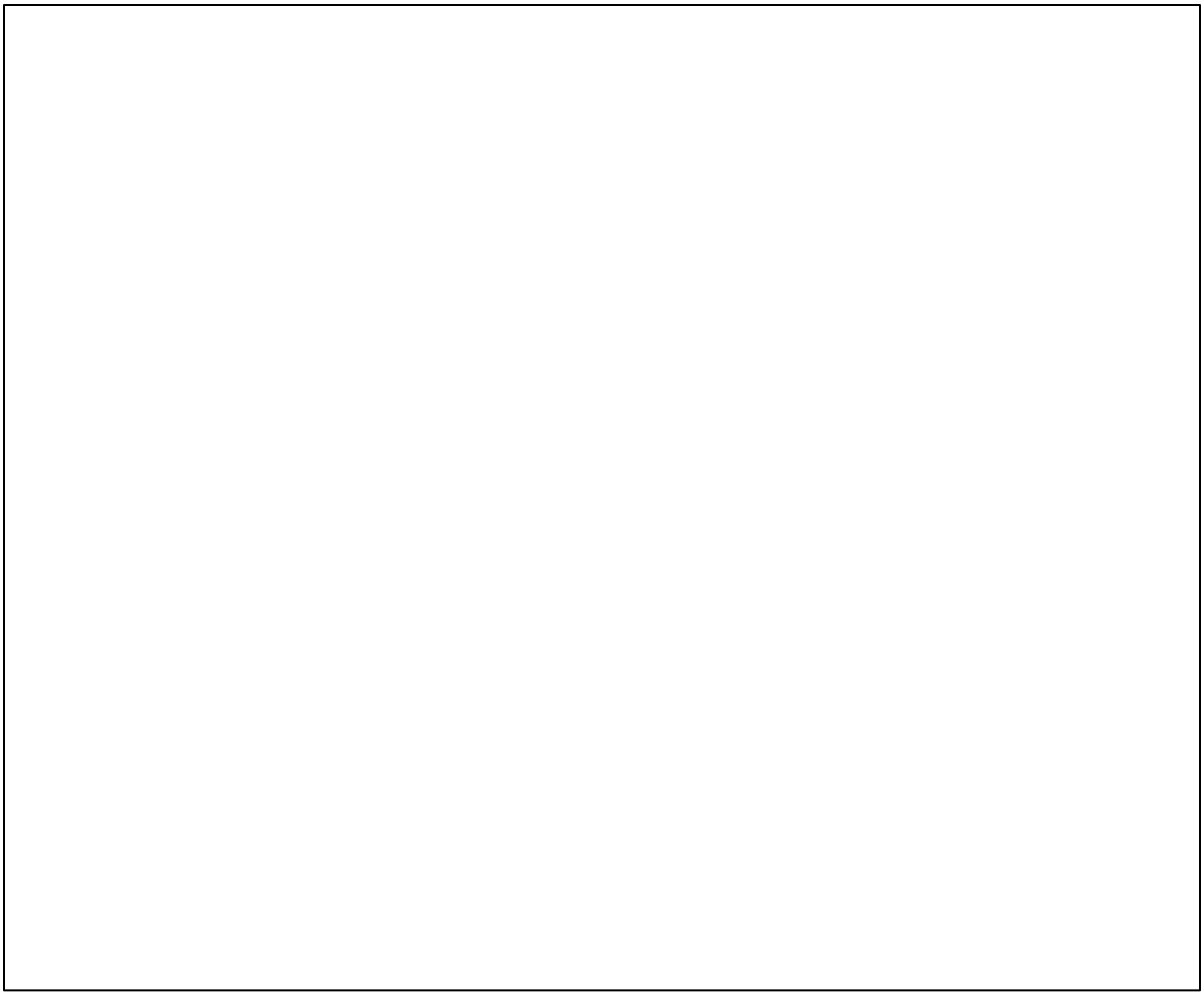

Figure 1. Mosquito surveillance in WV. Counties shown in brown are under active mosquito surveillance as of August 31, 2015. West Nile virus positive pools were detected in Kanawha, Wetzel, and Wood Counties.

Table 3. Summary of adult mosquito surveillance through July 24, 2015.

Mosquito Species	Total through Aug 31, 2015					Comments
	# Pools Tested	+ Arbovirus[a]				
		WNV	LAC	SLE	EEE	
Culex spp.	275	6	0	0	0	Pools from Kanawha, Wetzel, and Wood Counties
Non- *Culex* spp.	89	1	0	0	0	Pool from Kanawha
Total	364	7	0	0	0	

[a]Mosquito pools testing **positive** for arboviruses.

WNV=West Nile virus; LAC=La Crosse; SLE=St. Louis encephalitis; EEE=Eastern equine encephalitis

TICKS

HUMAN SURVEILLANCE

Through August 31, 2015, 172 tickborne disease cases were reported in West Virginia; the majority (94.8%) were cases of Lyme disease (n=164) (Figure 2). Spotted fever group rickettsioses (n=5) and ehrlichiosis (n=4) cases were also reported (Table 4). Thirty=three (60%) of West Virginia's 55 counties have reported human tickborne disease activity.

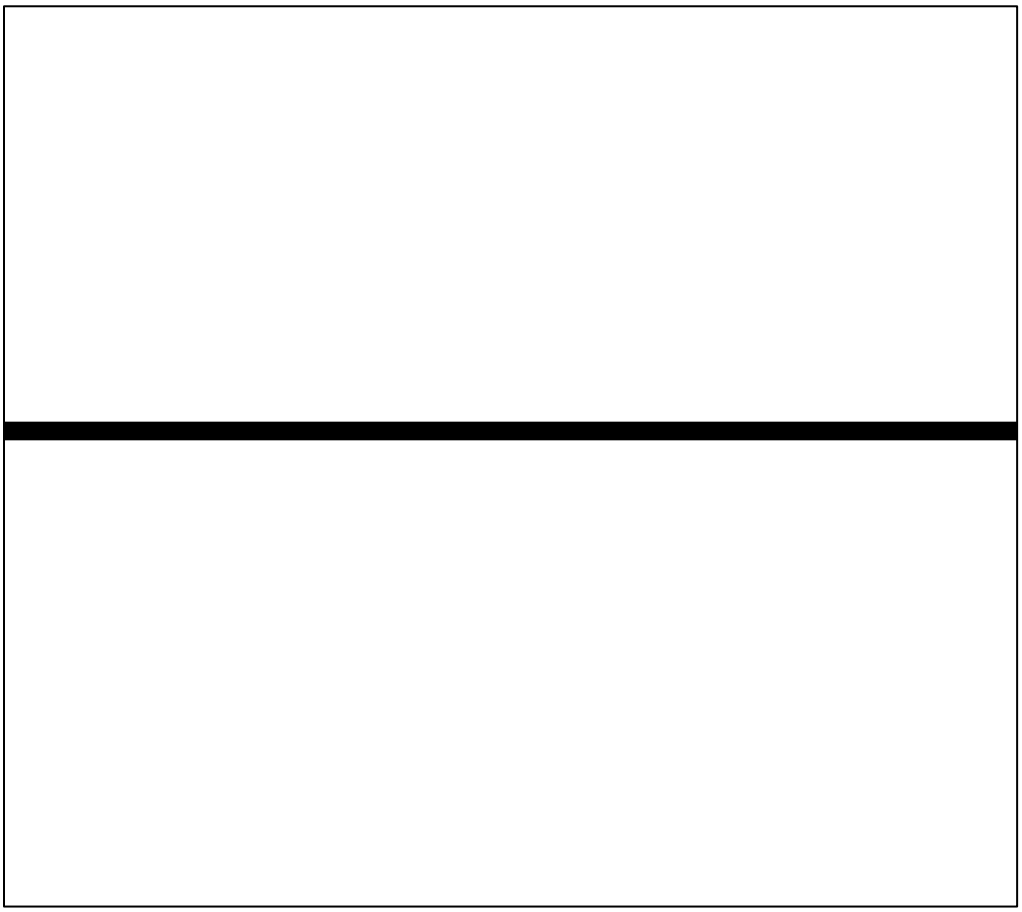

Figure 2. Distribution of reported human tickborne disease cases. Ehrlichiosis, Lyme disease and spotted fever group rickettsioses have been reported. Ehrlichiosis and SFGR cases are random positioned within the county from which they were reported.

Kanawha, Marshall, Roane, and Wetzel counties became Lyme disease "endemic" on August 15 based on the presence of two confirmed cases meeting clinical (erythema migrans ≥5 cm in diameter), epidemiologic (infection acquired within home county), and laboratory (EIA/IFA with reflex to Western blot) criteria. One hundred thirty-five (82.8%) reported Lyme disease cases were from West Virginia's 11 endemic counties.

Ehrlichiosis cases were reported in Boone, Cabell, Hampshire, and Mercer counties. Spotted fever group rickettsioses cases were reported in Berkeley, Jefferson, Monongalia, and Wayne counties.

Table 4. Summary of human cases of tickborne diseases through August 19, 2015[a].

Tickborne Disease	# Confirmed or Probable Cases through August 31, 2015[a]	# of Counties Where Disease Reported
Lyme disease	163	30
Spotted fever group rickettsioses[b]	5	4
Ehrlichiosis	4	4
TOTAL	**172**	**33 counties**

[a]Table includes only confirmed or probable cases that have been reviewed and closed by Zoonotic Disease Epidemiologist.

[b]Includes Rocky Mountain spotted fever

TICK SURVEILLANCE

Active surveillance across the state began on May 8, 2015 at eleven sites in West Virginia. Sites were selected based on 2014 human Lyme disease surveillance data and 2014 West Virginia Veterinary Tick Submission Program (WVVTSP) data (ticks were identified on animal host). *Ixodes scapularis,* tick vector for Lyme disease, anaplasmosis, babesiosis, and Powassan encephalitis, was collected in four of 16 sites: Greenbrier St. (Charleston) (n=47), Tygart Lake State Park (n=14), 4-H Camp Muffly (n=1), and WVU Core Arboretum (n=1) (Figure 3). Ticks collected from active surveillance efforts will undergo pathogen testing in the upcoming weeks.

Figure 3. Active tick surveillance sites in West Virginia. *I. scapularis* has been identified at four sites across the state.

VETERINARY TICK SURVEILLANCE

Veterinarians from 42 practices (41 in WV and one in Pennsylvania) have submitted 873 ticks from animal clients for identification from January 4 through August 11, 2015 (Table 5). Five species have been identified: *A. americanum*, *D. variabilis*, *I. cookei*, *I. scapularis*, and *R. sanguineus*. Ticks have been collected from 49 counties (40 counties in WV, 1 county in Maryland, 2 counties in Ohio, 3 counties in Pennsylvania, and 3 counties in Virginia) based on the home county of the animal host (Figure 4). Animal hosts include cats, a chipmunk, dogs, a horse, and humans.

Table 5. West Virginia Tick Surveillance Project cumulative IDs as of August 31, 2015.

Species of Tick	# of ticks submitted and identified	Animal host from which tick was removed	# of counties with tick species[1]
Amblyomma spp. (including *Amblyomma americanum*)	83	Dog, Horse	12
Dermacentor variabilis	662	Cat, Dog, Human	42
Ixodes cookei	32	Cat, Dog	9
Ixodes scapularis	76	Cat, Chipmunk, Dog	22
Rhipicephalus sanguineus	2	Dog	1
Ixodes spp.	17	Cat, Dog	13
TOTAL	**873 ticks**	**5 host species**	**49 counties**

[1]Based on home county of animal host. Includes counties outside of West Virginia.

Figure 4. 2015 WVVTSP submissions by home county of animal host. Five species of ticks have been identified from 49 counties in West Virginia and surrounding states.

CUMULATIVE HUMAN VECTORBORNE DISEASE SURVEILLANCE SUMMARY (Jan 1– August 31, 2015)

County	MOSQUITO-BORNE					TICKBORNE					
	LAC	WNV	CHIK	DF	Malaria	Anaplasmosis	Ehrlichiosis	Lyme disease	RMSF	Q fever	Tularemia
Barbour								2			
Berkeley								26	1		
Boone							1				
Braxton											
Brooke											
Cabell							1				
Calhoun											
Clay											
Doddridge											
Fayette								1			
Gilmer											
Grant								1			
Greenbrier								1			
Hampshire							1	19			
Hancock								11			
Hardy											
Harrison								1			
Jackson								2			
Jefferson								31	1		
Kanawha								8			
Lewis											
Lincoln											
Logan											
McDowell											
Marion								1			
Marshall								3			
Mason											
Mercer							1	4			
Mineral								10			
Mingo								1			
Monongalia				1				2	1		
Monroe								3			
Morgan								19			
Nicholas											
Ohio								1			
Pendleton											
Pleasants								1			
Pocahontas											
Preston								1			
Putnam								2			
Raleigh	2							1			
Randolph											
Ritchie											
Roane								3			
Summers											
Taylor								1			
Tucker											
Tyler											
Upshur											
Wayne									2		
Webster								1			
Wetzel								2			
Wirt											
Wood								3			
Wyoming											
TOTAL	**2**	**0**	**0**	**1**	**0**	**0**	**4**	**163**	**5**	**0**	**0**

*Table includes only confirmed or probable cases that have been reviewed and closed by the Zoonotic Disease Epidemiologist.

LAC = La Crosse encephalitis WNV= West Nile virus CHIK= chikungunya DF= dengue fever
RMSF= Spotted fever group rickettsioses including Rocky Mountain spotted fever